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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/893,329	06/26/2001	Michael J. Tracy	MIC1.PAU.11	2036

7590 03/28/2003

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EXAMINER
SAINT SURIN, JACQUES M

ART UNIT	PAPER NUMBER
2856	5

DATE MAILED: 03/28/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/893,329	TRACY, MICHAEL J.	
	Examiner	Art Unit	
	Jacques M Saint-Surin	2856	

– The MAILING DATE of this communication appears on the cover sheet with the correspondence address –

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *11/27/01, 10/19/0 and 06/26/01* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-21* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-7 and 12-17* is/are rejected.

7)☒ Claim(s) *8-11 and 18-21* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *19 October 2001* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 4 .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1-5 and 12-15 are rejected under 35 U.S.C. 102(b) as being anticipated by Hsu et al. (US Patent 5,955,668).

IR 8/24/03

Regarding claims 1 and ~~12~~ 2, Hsu et al. ('668) discloses a method of setting the drive and sense frequencies of a gyroscope having a drive mass and a sense mass coupled together by a flexure assembly (the present reference essentially separates the mass (momentum of inertia) of the constant motion element driven to oscillate around the drive axis from the mass (momentum A of inertia) of the variable motion sensing element which creates the measured force, see: col. 2, lines 46-50), comprising:

selecting a drive stiffness, K_d (the ring element 20 is excited to oscillate about its center (drive) axis 21, see: col. 4, lines 56-57); see also col. 3, lines 49-52 (the outer element 20 is caused to oscillate at a predetermined rate around a drive axis 21, which is perpendicular to the plane of the micro-gyro);

selecting geometric parameters of said flexure assembly to obtain a desired drive frequency, w_d (the width of the flexures 32 and 34 preferably would be in the range of

3-5 microns, and their length would be designed to provide the desirable functional results, see: col. 4, lines 28-31);

selecting a configurational parameter of said flexure assembly to obtain a desired sense frequency, w_s; (mechanical adjustments may be made by changing slightly the geometry of flexures 32, 34 and 36, see: col. 6, lines 20-21);

and determining whether said gyroscope has obtained desired performance and size envelope characteristics (obtaining resonant frequencies which match one another where desired, and which are isolated from one another in other relationships, is accomplished primarily by adjusting mass and structural thickness of elements in the design geometry; and as stated in the previous paragraph, adjusting the widths and lengths of the flexures in the micro-gyro is the most effective way of fine-tuning the design, see: col. 8, lines 15-22).

Regarding claim 12, as discussed above, it is an apparatus claim that performs the functions required by the steps of method claim 1. Therefore, it is rejected for the reasons set forth for that claim. Furthermore, Hsu et al. ('668) discloses a drive mass (driving element 20) and a sense mass (sensing element 22) see: col. 4, line 7.

Regarding claims 3 and 13, Hsu et al. ('668) discloses the combination of the sensing electrodes 60 and 62 and rebalancing electrodes 64 and 66 also provides a means for self-testing the micro gyro. To do so, the rebalancing electrodes 64 and 66 are intentionally injected with a voltage that tilts the disk 22. The resulting movement can be verified with the sensing electrodes 60 and 62. The measured change, for example in capacitance value, can be compared to the values stored in memory for

acceptable values obtained during calibration. In this manner, the sensor can be tested at the start of every application. The self-testing capability is particularly crucial for applications where high reliability and safety are involved. (see: col. 5, lines 60-67 and col. 6, lines 1-4.

Regarding claims 4 and 14, Hsu et al. ('668) discloses the resonant frequency of disk 22 is obtained by adjustment of the mechanical design of the micro-gyro components and the most effective way of "fine-tuning" the mechanical design to cause matching resonant frequencies of the elements 20 and 22 is working with the flexures (or hinges) 32 and 34 which connect element 22 to its anchors, and with the flexures (or spokes) 36 which connect element 20 to element 22. Hsu et al. ('668) further discloses adjusting the sizes of the flexures 32, 34, and 36 provides a simple and effective way of matching the resonant frequencies of elements 20 and 22, see: col. 7, lines 47-55).

Regarding claims 5 and 15, Hsu et al. ('668) discloses ss an example of the desired frequencies, the resonant frequency of ring element 20 around the drive axis 21 may be 2,800 hertz; the resonant frequency of disk element 22 around output axis 24 should be the same, 2,800 hertz; and the resonant frequency of ring element 20 around the output axis 24 should be much different, e.g., 800 hertz, see: col. 8, lines 9-15.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 6-7 and 16-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hsu et al. (5,955,668) in view of Bernstein (US Patent 5,203,208).

Claims 6 and 16 differ from Hsu et al. by reciting flexures within said flexure assembly are oriented symmetrically about an axis of symmetry of said gyroscope and where selecting an orientation of at least one flexure within said flexure assembly relative to other ones of said flexures with said flexure assembly comprises selecting one of a possible number of orientations of said at least one flexure to said axis of symmetry of said gyroscope. Bernstein ('208) discloses the flexures are similarly symmetrically arranged about the drive or Y axis 34 and for example, a new flexure pair comprising flexures 18 and 22 is attached to a first side of inertial mass support plate 14 and gyroscope support frame 24 whereby each of the flexures 18 and 22 are arranged at generally a 45.degree. angle from the drive or Y axis 34. Bernstein ('208) further discloses a second new flexure pair comprised of flexures 16 and 20 is disposed on a diametrically opposed side of the inertial mass support plate and gyroscope frame from flexures 18 and 22 and flexures 16, 23 and 20 are also disposed at 45.degree. angles from the drive or Y axis 34 wherein all four flexures 16-22 participate equally during rotation about both the X and Y axes 42,34, respectively (see: col. 3, lines 15-28). It would have been obvious to one having ordinary skill in the art at the time of the invention to utilize in Hsu et al. the symmetrical arrangement of Bernstein because the symmetry would ensure that even if minor variations in spring

constant occur due to either manufacturing process or work-hardening, the resonant frequencies of the drive and sense axes of the gyroscope will remain identical. Thus, the above combination would provide the advantages of greatly reducing the drive voltage required to induce vibration in the inertial mass and allowing the gyroscope to operate with much higher sensitivity.

Regarding claims 7 and 17, Hsu et al. discloses flexures 32, 34, but does not disclose or suggest selecting an angle which said pair of flexures makes to each other. Bernstein discloses a first pair of flexures 16-18 are each arranged at a 45 degrees angle to the drive and sense axes, see: col. 3, lines 8-11. It would have been obvious to one having ordinary skill in the art at the time of the invention to utilize in Hsu et al. the techniques of Bernstein because the flexures are arranged at 45 degrees from the drive or Y axis and at 45 degrees to the X or sense axis for the purpose of providing a symmetric arrangement of the flexures in order to participate equally during rotation of the mass.

Allowable Subject Matter

5. Claims 8-11 and 18-21 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jacques M Saint-Surin whose telephone number is (703) 308-3698. The examiner can normally be reached on Monday-Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Hezron Williams can be reached on (703) 305-4705. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 308-7722 for regular communications and (703) 308-7724 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308 0956.

Jacques M. Saint-Surin
March 23, 2003

HELEN KWOK
PRIMARY EXAMINER